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DESCHUTES RIVER BASIN (OREGON). PRELIMINARY ECONOMIC RECONNAISSANCE AND ESTIMATE OF GROWTH, 1960-2010

Public Health Service
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ENGINEERING BRANCH
COLUMBIA BASIN PROJECT

COLUMBIA RIVER BASIN PROJECT
For Water Supply and Water Quality Management

DESCHUTES RIVER BASIN (OREGON)
PRELIMINARY ECONOMIC RECONNAISSANCE AND ESTIMATE OF GROWTH, 1960-2010

DATE: February 28, 1962

Prepared by EES

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U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Region IX

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This working paper contains preliminary data and information primarily intended for internal use by the Columbia River Basin Project staff and cooperating agencies. The material presented in this paper has not been fully evaluated and should not be considered as final.

DESCHUTES RIVER BASIN (OREGON)
PRELIMINARY ECONOMIC RECONNAISSANCE AND ESTIMATE OF GROWTH, 1960-2010

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Prepared by: Economics Studies Group
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February 28, 1962

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DESCHUTES RIVER BASIN (OREGON)
PRELIMINARY ECONOMIC RECONNAISSANCE AND ESTIMATE OF GROWTH, 1960-2010

I. Introduction

A. Purpose of This Analysis

This analysis is intended to provide a preliminary estimate of the economic potentials and anticipated growth of the subject area.

B. Definition of the Area

The Deschutes River Basin, for purposes of this study, is defined to include all of Jefferson, Crook and Deschutes Counties, all of Wasco County except for the northwest portion containing The Dalles, the western portion of Sherman County, and a small area in the north of Klamath County.

C. Study Period

The study period is the 50-year period 1960-2010, with an interim point at 1980.

D. Limitations of This Analysis

Two limitations apply to this study. The first is that it is intended only as a preliminary estimate of the outlook for the subject area's growth. Subsequently, in connection with the Columbia River Basin Project for Water Supply and Water Quality Management, an analysis will be made on an industry-by-industry basis of the growth potential in the various sub-basins. At that time, this preliminary estimate will be reviewed, and revised if necessary.

The second limitation is that this study is intended for use particularly in assessing future water needs. Emphasis has been placed on the analysis of those industries which make heavy demands upon the water resource. Other industries have been considered only insofar as they may have a significant effect on future population. For this reason, this study is not submitted as a detailed industrial forecast.

II. Present Economy of the Basin

A. Population

Estimated population in the Deschutes River Basin is shown in Table 1. During the period 1940-60, the Basin's population grew more rapidly than the rest of Eastern Oregon, although its growth rate was

considerably below that for the State of Oregon as a whole. Most of the growth came during the 1940-50 decade; population growth in the Basin during the last 10 years was only seven percent.

Table 1
ESTIMATED POPULATION IN THE DESCHUTES RIVER BASIN

Area	Population, in thousands			1950 as % of	1960 as % of	1960 as % of
	1940	1950	1960[a/]	1940	1950	1940
Crook County, total	5.5	9.0	9.4			
Deschutes County, total	18.6	21.8	23.1			
Jefferson County, total	2.0	5.5	7.1			
Klamath County, portion	1.1	1.1	1.1			
Sherman County, portion	0.4	0.5	0.5			
Wasco County, portion	2.9	3.0	2.4			
TOTAL, DESCHUTES BASIN	30.5	40.9	43.6	134	107	143
Remainder of Eastern Oregon	180.4	206.5	221.6	114	107	123
Oregon, State total	1089.7	1521.3	1768.7	140	116	162

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a/ This estimate differs slightly from a 1960 population estimate for the Deschutes River Basin given in the State Water Resources Board's Deschutes River Basin report, January 1961, page 4, which study defines the Basin to include a portion of Sherman County along the Columbia River which is outside the physical boundaries of the Deschutes Basin. The population of the additional portion of Sherman County included in the SWRB report is about 700. The estimate in Table 1 for the portion of Wasco County in the Deschutes River Basin is slightly higher than that in the SWRB report.

The ten incorporated communities in the Basin are listed in Table 2, with their populations at the time of recent censuses. The total population of these ten incorporated places was 50 percent of total Basin population in 1960, the same percentage as in 1950 and 1940. It would appear that the urban-ward shift of population typical of other Basins has not been experienced in the Deschutes Basin. This may partly be due to a failure of the cities here to annex growing areas around them. If the urbanized but unincorporated area called "Prineville Southeast", referred to in footnote "b" of Table 2, were included with Prineville, the percentage of Basin population living in the ten cities would be 53 in 1960. The absence of a significant urban-ward trend may also be related to the extensive-type agricultural economy of this area.

The principal cities in the Basin experienced considerable growth during the 1940-50 decade, but their growth during the last ten-year period was relatively slow. As shown in Table 2, the ten cities in the Basin together increased only 6 percent in population during the period 1950-60, approximately paralleling the 7 percent population increase in the Basin as a whole during that period.

The three principal cities in the Basin (Bend, Redmond and Prineville) contain 43 percent of Basin population and, if suburban areas immediately adjacent to them are included, about half the entire Basin's inhabitants are in these three communities.

Table 2
POPULATION IN INCORPORATED PLACES IN THE DESCHUTES BASIN

City	County	Population 1940	1950	1960	1960 as % of 1950
Antelope	Wasco	90	60	46	77
Bend	Deschutes	10,021	11,409	11,936	105
Culver	Jefferson	(a)	301	301	100
Madras	Jefferson	412	1,258	1,515	120
Maupin	Wasco	267	312	381	122
Metolius	Jefferson	40	157	270	172
Prineville	Crook	2,358	3,233	3,263 (b)	101
Redmond	Deschutes	1,876	2,956	3,340	113
Shaniko	Wasco	55	61	39	64
Sisters	Deschutes	(a)	723	602	83
Total, Ten cities		15,119	20,470	21,693	106

(a) Unincorporated in 1940, no data available.
(b) Excludes "Prineville Southeast", a built-up area adjacent to Prineville but outside its corporate limits, and containing 1299 persons in 1960. It was not enumerated separately in 1950, since its population then was less than 1000.

In addition to the ten incorporated places, there are about 60 identifiable communities that are unincorporated. With the exception of "Prineville Southeast", a suburb of Prineville, they are all quite small, most of them having a population of less than 100.

B. Industry

The economy of the Deschutes River Basin is heavily dependent upon agriculture and upon lumber and wood products manufacturing. Table 3 shows the employment pattern in Crook, Deschutes and Jefferson Counties in 1950. Employment data are not available for portions of counties, but it is believed that the industrial and employment pattern in the portions of Klamath, Sherman and Wasco Counties lying in the Deschutes River Basin are similar to the rest of the Basin. About 90 percent of Basin population is in the three counties totalled in Table 3. The adjacent portions of Klamath, Sherman and Wasco Counties are similar geographically to the rest of the Basin and contain no large communities. For these reasons, it is assumed that Table 3 reflects accurately the employment pattern in the entire Basin as of 1950. Data are not yet available from the 1960 census, but on the basis of statistics from the State Department of Employment, it appears that the employment pattern has not changed significantly since 1950.

Nearly half of the entire labor force in the Basin is in agriculture and lumber and wood products manufacturing. The rest of the labor force is in service industries, so that the economic base rests almost wholly on agriculture and lumber and wood products manufacturing.

Table 3
EMPLOYMENT, BY INDUSTRY, IN CROOK, JEFFERSON AND DESCHUTES COUNTIES, 1950
(Data for Employed Civilian Labor Force)

Total Population	36,339
Total Employment	14,064
Agriculture	2,850
Forestry and fisheries	142
Mining	72
Manufacturing, TOTAL	3,526
Lumber, wood products	3,103
Food and kindred	141
Printing and publishing	126
All other	156
Construction	938
Services	6,363
Industry not reported	173

Table 4 shows the relative specialization in the Deschutes River Basin economy by comparing the distribution of the labor force there with the distribution in the Portland Region, of which it is a part. The table illustrates the Deschutes River Basin's heavy concentration in agriculture and lumber and wood products manufacturing, and its dependence upon the Portland Metropolitan Area for many services.

Principal agricultural products are wheat, potatoes, hay, seeds, and beef and milk cattle.

Table 4
EMPLOYMENT BY INDUSTRY PER 1000 OF TOTAL POPULATION, 1950
(Data for Employed Civilian Labor Force)

Industry	Deschutes Basin[1]	Portland Region[2]
Total Employed Labor Force per 1000 population	387.0	376.1
Agriculture	78.4	44.7
Forestry and fisheries	3.9	2.2
Mining	2.0	1.0
Manufacturing, TOTAL	97.0	89.4
Lumber, wood products	85.4	53.5
Food and kindred	3.9	8.4
Printing, publishing	3.5	4.8
All other manufacturing	4.2	22.7
Construction	25.8	27.9
Services	175.1	205.7
Industry not reported	4.8	5.2

1/Distribution based on figures for Crook, Jefferson and Deschutes Counties.
2/Includes all of Oregon plus five counties in southwestern Washington.

III. Estimated Future Growth

A. Factors Influencing Future Growth.

During the past decade, little diversification occurred in the economy of the Deschutes River Basin, and the economic base remained almost exclusively dependent upon agriculture and lumber and wood products manufacturing. The Dalles, where some diversified manufacturing has grown up, is outside this Basin, and such industrial development along the Columbia River is not expected to have any major impact on the Deschutes Basin. The future of the Basin is expected to continue to be tied closely to agriculture and timber-based industries. The only other major activity with potential growth would appear to be service employment based on recreation.

The principal industry in the Basin, in terms of employment, is lumber and wood products manufacturing. The outlook for employment in this industry depends on (1) maintaining the timber harvest, and (2) developing secondary manufacturing, that is, going beyond sawmill products to fabrication of doors, mouldings, panelling and other finished products embodying additional labor.

The outlook for maintaining or increasing the timber harvest is complicated by the fact, as shown in Table 5, that about one-third of the forested land in the Basin is now in juniper, which has not heretofore been of much commercial use. How much employment could be built upon a sustained-yield harvesting of that species is problematical.

Table 5
FOREST ACREAGE IN PRINCIPAL TREE SPECIES
IN CROOK, DESCHUTES AND JEFFERSON COUNTIES[1/]
(Data in thousands of acres)

Total Forest Land	Ponderosa Pine	Lodgepole Pine	Douglas Fir	Juniper	Other
2,918	1,292	230	34	1,052	310

1/ Source: State Water Resources Board, Deschutes River Basin, January 1961, p. 6.

The principal commercial species is ponderosa pine. A major part of this timber is on U. S. Forest Service land, but there are also a few large private holdings. Harvesting of trees on the Forest Service land is approximately at its sustained yield maximum. The supply of timber from private land may decline in the future and competition is likely to be severe for logs. The general trend towards reduction in the number of mills and the consolidation of smaller operations with larger, more efficient plants is likely to be even more marked in this Basin than in other parts of the State, because of the competition for logs. This will probably mean an acceleration of the historic trend of rising productivity per worker, so that, even if total lumber output should increase moderately, there might be no increase in employment.

Employment in wood products manufacturing could increase if additional secondary fabrication is developed in the Basin. An example would be the establishment of a pulp or paper mill in the Bend area. It appears that the raw materials necessary to such a plant are available. However, there is considerable doubt whether the unappropriated water available in the Basin would be adequate to support such a plant. An

alternative use of such raw materials would be to ship them down to the Columbia River or across the Cascades, for processing at large plants outside the Basin.

On balance, it appears that the various factors outlined above may tend to offset each other, so that total employment in lumber and wood products manufacturing in the Basin may remain at about its present level for the foreseeable future. Vigorous development of secondary products could lead to some increase in employment.

The outlook for growth in the other principal industry in the Basin, agriculture, is somewhat more favorable than that for the timber-based industries. This is due to the possible increases in irrigation. However, though it is anticipated that agricultural production will increase, that will not be accompanied by a proportionate increase in agricultural employment, due to rising productivity per worker in agriculture.

In other areas, where the advent of irrigation has made possible the cultivation of heretofore unused acres, a large population increase has often resulted. In the Deschutes Basin, however, it appears that additional irrigation is likely to be used not to increase acreage but to firm up the water supply on acreage now receiving less than its full water needs. This will tend to increase productivity per acre and productivity per worker rather than increase the number of persons working in agriculture.

While there is still some unappropriated water in the Basin, it is not certain how much of it will be available to agriculture. The principal increase in water for irrigation will come through increased efficiency in irrigation use. At present, the loss of water through the porous soil is abnormally high.

Agricultural output will increase in the Basin, but this is not expected to lead to development of significant employment in food processing. Aside from about 100 workers in "food and kindred" manufacturing in Bend, there is very little food processing in the Basin at the present time. As in the case of wood products manufacturing, the trend in food processing is towards fewer, larger, more efficient plants. Any new plants in this Basin would have to compete with large, existing plants outside the Basin. It seems likely that most of the agricultural produce of the Basin will continue to be shipped outside the Basin without local processing.

If the maximum size of individual acreage holdings in irrigation projects is limited by government policy, this would result in some

increase in the number of persons working in agriculture, though it might have the opposite effect on productivity. In general, it appears that total employment in agriculture and related activities in the Basin as a whole is likely to remain at its present level or increase only moderately.

Employment in recreation-based service industries is expected to increase moderately in the future.

B. Estimated Future Population.

Population in the Deschutes River Basin grew during the period 1940-50 at a rate of 3 percent per year, below the rate for the State as a whole of 3.4 percent but still a high rate of increase. However, that high growth was largely a result of a rapid expansion of the lumber and wood products industry which is not likely to be repeated in the future. Growth in the Basin during the period 1950-60 was only 0.6 percent per year, compared with a growth rate in the State as a whole during the same period of 1.5 percent per year. The relationship of growth in the Deschutes River Basin to growth in the State as a whole during this latter decade is likely to be typical of the future. On this basis, and in terms of preliminary estimates of future growth in State population (2.0 percent for 1960-80, 1.7 percent for 1980-2000, and 1.5 percent for 2000-2010), future population in the Deschutes River Basin might be expected to grow as follows:

Table 6
ESTIMATED FUTURE POPULATION OF THE DESCHUTES RIVER BASIN
(Population in thousands; rate of growth in % per year)

1960 Pop.	1960-80 Rate	1980 Pop.	1980-2000 Rate	2000 Pop.	2000-2010 Rate	2010 Pop.
43.6	0.8%	51.3	0.7%	58.9	0.6%	62.6

Table 7 shows a preliminary appraisal of the distribution of estimated future population between urban and rural areas and among the various cities of the Basin, assuming the growth rates shown in that table.

The portion of Basin population in incorporated places has remained constant, at half of total population, for the past 20 years. For purposes of this preliminary analysis, it is assumed that there will be a gradual, small increase in the portion of total population in incorporated places. On the basis of the assumptions made in Table 7, the portion of Basin population in urban places would rise to 52 percent in 1980, 54 percent in 2000, and 56 percent in 2010.

Most rapid population growth in the Basin in the future is likely to be in the Deschutes Valley in and around Bend and Redmond. As the major city in the Basin, Bend is likely to attract a large share of additional population. Bend is also strategically located in relation to present and potential recreation areas. The area around Bend and Redmond would benefit from irrigation made possible by a proposed dam at Benham Falls. Both Bend and Redmond are located on the major north-south rail and highway facilities.

Madras grew rapidly during the 1940-60 period, due to an increase in irrigation in that vicinity. The major impact of increased irrigation is now believed to be past, and the economy is likely to stabilize at the present level, with only a small rate of increase.

Potential consolidation of pine lumber mills at Prineville could limit employment growth there. Big Prairie dam, on the upper Crooked River, might have provided increased irrigation for the area around Prineville, but this dam was found economically unfeasible.

Table 7
FUTURE POPULATION DISTRIBUTION, DESCHUTES RIVER BASIN
(Population in thousands; growth rate is % per year)

Area	1960 Pop.	1960-80 Rate	1980 Pop.	1980-2000 Rate	2000 Pop.	2000-10 Rate	2010 Pop.
TOTAL, Deschutes Basin	43.6	0.8%	51.3	0.7%	58.9	0.6%	62.6
Rural (a)	21.9	0.6	24.7	0.4	26.8	0.3	27.8
Ten Incor. Areas, TOTAL	21.7	1.0	26.6	0.9	32.1	0.8	34.8
Bend	11.9	1.4	15.7	1.2	19.9	1.0	22.0
Redmond	3.3	1.0	4.0	0.9	4.8	0.8	5.2
Prineville	3.3	0.3	3.5	0.3	3.7	0.3	3.8
Madras	1.5	0.3	1.7	0.3	1.9	0.3	2.0
Six other cities	1.7	0.1	1.7	0.1	1.8	0.1	1.8

(a) Includes all population outside the ten incorporated municipalities.

C. Future Land Use

According to a survey in 1960 made for the U. S. Soil Conservation Service, not much change in land use is anticipated in the Basin during the

next fifteen years. Present and future land use, as estimated in that survey, are shown in Table 8. For purposes of this preliminary analysis, it is assumed that the land use pattern reflected by Table 8 will continue for the entire study period.

Table 8
PRESENT AND ESTIMATED FUTURE LAND USE
CROOK, DESCHUTES AND JEFFERSON COUNTIES

Type of Land use	Acres, thousands 1960	1975
Federal[1/]	2,612	2,612
Cropland	260	260
Pasture and range	1,016	1,046
Forest and woodland	1,009	997
All other	85	67
Total 3-county acreage	4,982	4,982

1/ Includes U. S. Forest Service, B. L. M., and Bureau of Indian Affairs.